A.1.1

File
MID044 255 420

5R4-13

DEC 19 1984

Ms. Janet M. MacNiel
McCoy and Associates
13131 West Cedar Drive
Lakewood, Colorado 80228

Re: Freedom of Information Act Request
RIII-691-84

Dear Ms. MacNiel:

This is in response to your Freedom of Information Act Request dated November 30, 1984. In your letter you requested the complaint and compliance order issued to the following facility on October 11, 1984 for alleged Resource Conservation and Recovery Act violations:

Ford Motor Company
Sterling Axle Plant
39000 Mound Road
Sterling Heights, Michigan 48077
MID044255420

We are enclosing the requested document, titled Complaint, Findings of Violation, and Order. The October 11 date that you specified is the press release date. The actual date of the order is September 24, 1984. There is no charge for search time and copying, as the total fees are less than $10.00.

Please contact Mr. Gary Westefer, of my staff, at (312) 886-7450 if you have any questions, or are in need of further assistance.

Sincerely,

Basil G. Constantelos, Director
Waste Management Division

Enclosures

cc: Ohio Environmental Protection Agency
Ford Motor Company

bcc: N. Sullivan, OPA
C. Kavcic, WMD
J. Mayka
File

5HW:WMB:RAIII:WESTEFER,WESTEFER 12/13/84

EPA Environmental NEWS RELEASE

United States
Environmental
Protection
Agency
Region V
230 S. Dearborn St.
Chicago, IL 60604

TECHNICAL CONTACT: Ronald Kolzow
(312) 886-5145
MEDIA CONTACT: Virginia Donohue
(312) 886-6694

For Immediate Release: October 11, 1984

NO. 84-260

U.S. EPA FILES ADMINISTRATIVE COMPLAINT AGAINST FORD MOTOR CO. FOR HAZARDOUS WASTE VIOLATIONS

The U.S. Environmental Protection Agency (U.S. EPA) Region V today announced the filing of a civil administrative action against Ford Motor Co., 39000 Mound Rd., Sterling Heights, MI.

The complaint against Ford proposes a penalty of $24,700 and charges that the facility has violated Federal regulations for the generation and storage of hazardous waste.

B. G. Constantelos, director of the U.S. EPA Region V Waste Management Division, said the company was cited for violating hazardous waste rules under the Resource Conservation and Recovery Act (RCRA).

The U.S. EPA complaint states that the company has failed to meet specific requirements relating to hazardous waste generation and storage including: storage of a hazardous waste without a permit and without having achieved interim status, failure to implement a RCRA ground-water monitoring program, failure to comply with general requirements for a surface impoundment, and failure to properly label containers of hazardous waste.

Ford has the right to request that U.S. EPA hold a settlement conference and a hearing to discuss the charges. The company must make such a request by October 28, 1984.

# # #

A.1.8

Office of the General Counsel

Ford Motor Company
The American Road
Dearborn, Michigan 48121

January 14, 1986

Judge J. F. Greene
Office of Administrative Law Judges (A-110)
U.S. Environmental Protection Agency
401 M. Street, S.W.
Washington, D.C. 20460

Re: Ford Motor Company
Sterling Axle Plant
RCRA - V-W-84-R-077

Dear Judge Greene:

Pursuant to your directive in the telephone conference call on December 9, 1985 among counsel for respondent, petitioner and the court, transmitted herewith is a report of the interim progress made by Ford during the 90-day extension period referred to in the letter to Your Honor in the above-entitled matter from Marc M. Radell, dated November 22, 1985.

Very truly yours,

Norman W. Bernstein
Associate Counsel

Attachment

cc: Rodger Field
Asst. Regional Counsel

Marc M. Radell
Asst. Regional Counsel

Regional Hearing Clerk

Carson

#0509

CERTIFIED MAIL - RETURN RECEIPT REQUESTED

Ford Motor Company
One Parklane Boulevard
Dearborn, Michigan 48126

V. H. Sussman, Director
Stationary Source Environmental Control
Environmental and Safety Engineering

August 19, 1983

RECEIVED
AUG 23 1984
WASTE MANAGEMENT BRANCH

Administrator
U.S. Environmental Protection Agency
c/o Office of Solid Waste (WH-565)
401 M Street, S.W.
Washington, DC 20460

Subject: Petition for Delisting
Ford Sterling Axle Plant
EPA ID No. MID044255420

Dear Sir:

Transmitted herewith pursuant to the requirements of 40 CFR 260.20 and 260.22 is a certified Petition for Delisting covering wastewater treatment sludge generated at the above-referenced facility.

Please note that this submittal is part of the effort coordinated by the Motor Vehicle Manufacturers Association of the United States (MVMA), and relates to phosphate coating wastewater treatment sludge generated by integrated automotive manufacturing facilities common among dozens of plants of MVMA member companies throughout North America. Accordingly, we request that EPA review this petition as provided by applicable federal hazardous waste management regulations, in conjunction with the industry-wide effort that was undertaken following consultation with the EPA Office of Solid Waste. References: (1) October 1, 1982, MVMA-EPA Meeting in Washington, D.C., (2) November 8, 1982 letter from Mr. David Friedman to MVMA, (3) January 27, 1983 MVMA response to EPA.

As we have mentioned to EPA previously, the phosphate coating processes we utilize employ no cyanides and no electric current is applied. We believe that the test results and other documentation submitted with this Petition support our view that these wastes do not exhibit hazardous characteristics and should not be considered RCRA hazardous wastes. It is also our view that these wastes are not capable of posing substantial present or potential hazard to human health or the environment.

Consistent with provisions of 40 CFR 260.22(m) of the regulations, we believe that a sufficient case has been presented to EPA to conclude "that there is a substantial likelihood that an exclusion will be finally granted." A determination by EPA for a "temporary exclusion" is therefore urged to enable the plant to dispose of these sludges as non-hazardous solid wastes at the earliest possible date. Accordingly, we request your early review and approval of this petition.

Very truly yours,

Victor H. Sussman

/jb

Attachment

Petition for Delisting

(Reference: 40 CFR 260.22)

Petitioner:

Ford Motor Company
c/o Stationary Source Environmental Control Office
Mr. Victor H. Sussman, Director
Suite 628 W. Parklane Towers
1 Parklane Blvd.
Dearborn, MI 48126

Affected Facility:

Ford Motor Company Sterling Axle Plant
39000 Mound Rd.
Sterling Heights, MI 48078
EPA I.D. No. MID044255420

Proposed Action:

To exclude petitioner's wastewater treatment sludge from classification as the listed hazardous waste, F006 ("Wastewater Treatment Sludge from Electroplating Operations").

Petitioner's Interest:

The petitioner, being the generator and storer of the subject sludge, has a direct interest in the outcome of the proposed action. Disposal of these sludges as hazardous waste will result in the plant incurring considerable unnecessary expense.

Statement of Need and Justification:

Test results indicate the petitioner's sludge is not EP-toxic and does not possess other hazardous waste characteristics.

A non-hazardous classification of the sludge will result in a significant reduction in disposal, monitoring and any future closure costs.

SUPPORTING INFORMATION
PETITION FOR DELISTING
STERLING AXLE PLANT

Process Description

The Ford Motor Company Sterling Axle Plant is an integrated manufacturing facility which includes machining, grinding, stamping, welding, heat treating, cleaning, painting, assembly and testing operations. This plant produces automotive parts for shipment to other Ford assembly facilities.

As part of the Pin Gear Grinding and Gear Set Operations a phosphate coating process is employed. Wastewater flow consisting of mainly overflows from each of these phosphaters (0.045 MGD), along with discharges from all other manufacturing processes, is directed to the industrial wastewater treatment plant for processing. After processing, the total discharge flow (0.258 MGD) combines with the plant sanitary sewage system and is discharged to the City of Detroit Sanitary Sewer System.

Under current (since 1977) wastewater treatment operating processes, there is no sludge generated to be stored or hauled away. The current wastewater treatment plant operates 24 hours per day, 7 days a week as an oily wastewater treatment facility. It separates oil by the addition of a polymer to the process water influent just upstream of the wetwell. This separation is aided by the addition of a very small amount of ferric chloride solution to nucleate the suspended oil. The oily wastewater is then pumped to one of two 50,000 gallon tanks for further separation and floating oil skimming. Treated water is discharged to one of two 120,000 gallon clarifiers with the addition of more polymer. More floating oil is skimmed from the clarifiers by a central sweep type skimming arm. Final treated effluent water then flows over a weir bulkhead to a discharge line which empties into the sanitary sewer system.

The wastewater treatment plant process utilized prior to 1977, was operated under a slightly different manner. It was operated as a combination heavy metals and oily waste treatment facility (see Figure 1). As a combination facility it both skimmed oil in batch tanks and clarifier, and formed heavy metals sludge in the clarifier by the addition of ferric chloride and lime. The sludge formed in the clarifier was then pumped to three small lagoons for dewatering. After dewatering the sludge was either pumped to the Northeast and Northwest lagoons for storage or hauled off site by a vendor for disposal.

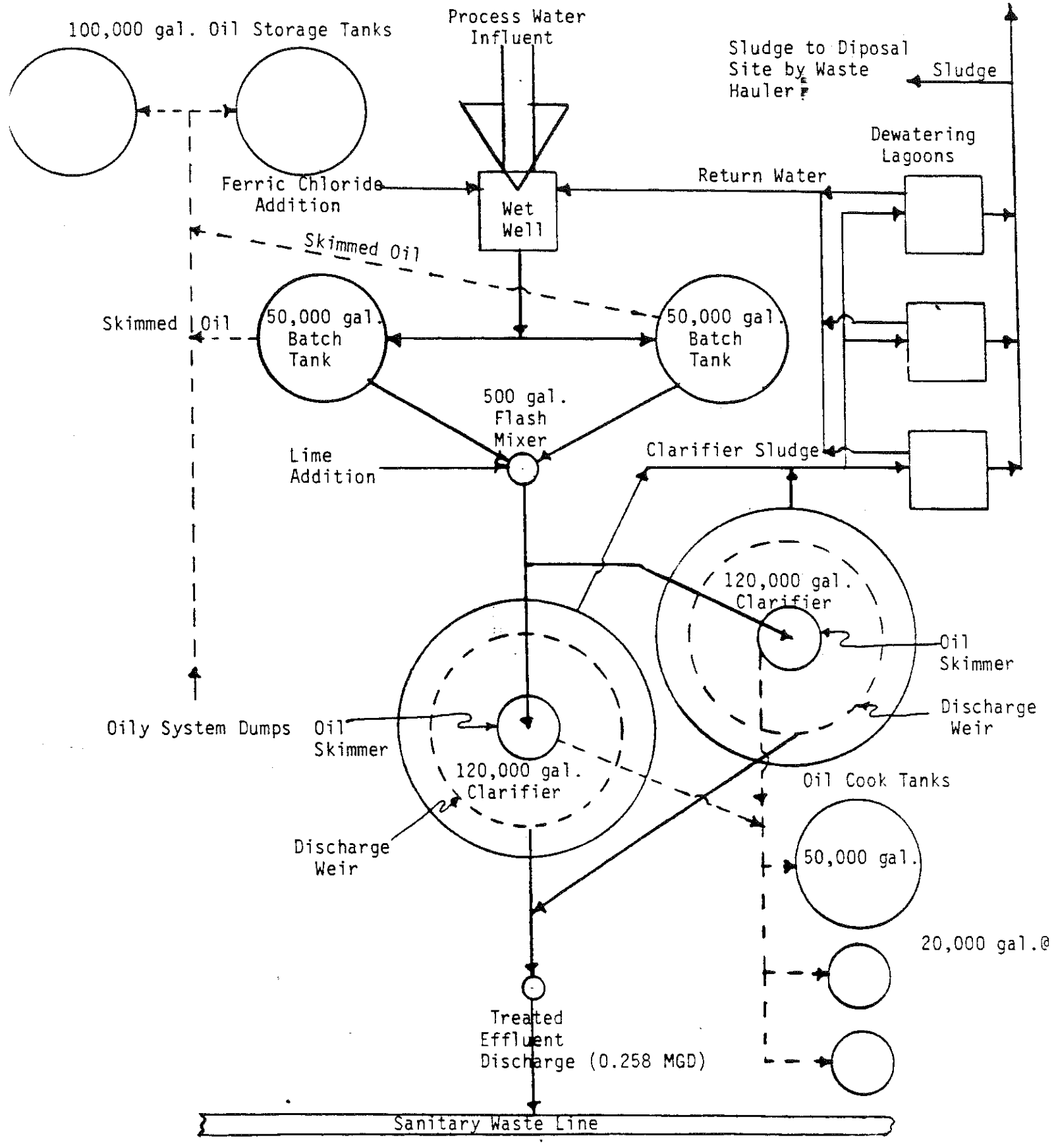
The sludges previously generated and presently stored in the Northeast and Northwest lagoons are the subject of this petition. Because sludge from the treatment of the "electroplating" (phosphate coating) rinsewater was formed concurrently with, and was thereby comingled with the sludge from treating remaining wastewaters, EPA has advised the sludge must be considered a "listed" hazardous waste, i.e., F006.

Sludge Generation Data

As indicated earlier the plant does not presently generate sludge (F006) resulting from the treatment of phosphate coating wastewater. The two lagoons covered by this delisting petition contain a total of approximately 45,000 yd^3 of sludge.

Figure 1

Sterling Axle Plant
Industrial Wastewater Treatment Plant
(Prior to 1977)



Data Summary

Table 1 summarizes the analytical average results for heavy metals as they were determined in both the filtered EP leachate and in the sample as received (wet) and for total cyanide in the sample as received. A mathematical calculation of the maximum level possible for cyanide is also shown, as if a distilled water leaching had been performed. The 80% upper confidence level has also been calculated for the metals in the leachate. The number of samples collected corresponds to the requirements outlined in SW846, 2nd edition.

As can be seen from the table, the 80% upper confidence levels are such that the sludge is not EP-toxic. Therefore, these sludges, being also non-flammable, non-corrosive, and non-reactive, should be considered to be non-hazardous.

Table 1

Sterling Axle Plant
Data Summary

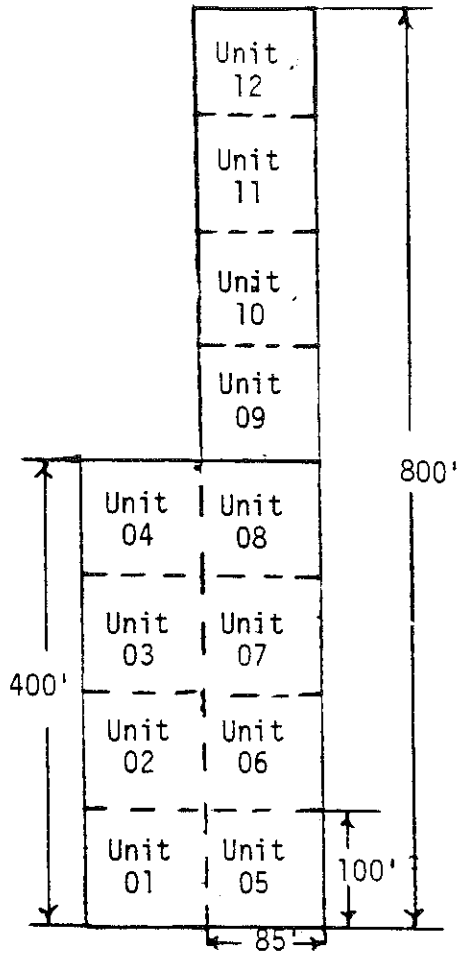
Parameters	North East Sludge Lagoon			North West Sludge Lagoon		
	Avg. Leachate Concentration (mg/L)	Leachate UCL Concentration (mg/L)	Avg. Sample Wet Weight Concentration (mg/Kg)	Avg. Leachate Concentration (mg/L)	Leachate UCL Concentration (mg/L)	Avg. Sample Wet Weight Concentration (mg/Kg)
Arsenic	< 0.05	0.05	10.4	< 0.05	0.05	13.8
Barium	0.3	0.4	102	0.7	0.8	59
Cadmium	< 0.05	0.05	4.0	< 0.05	0.05	3.2
Chromium	< 0.05	0.05	67	< 0.05	0.05	51
Copper	< 0.05	0.05	106	< 0.05	0.05	112
Lead	< 0.05	0.05	238	< 0.05	0.05	103
Mercury	< 0.0005	0.0005	0.1	< 0.0005	0.0005	0.1
Nickel	0.77	1.12	65	0.99	1.08	52
Selenium	< 0.005	0.005	< 0.1	< 0.005	0.005	< 0.1
Silver	< 0.05	0.05	1.2	< 0.05	0.05	0.8
Zinc	1.60	2.38	320	2.08	2.30	192
Cyanide	0.04*		0.8	0.05		1.0

* This value is mathematically calculated by applying a dilution factor of 20 to correspond to that which would be used for an EP leachate, assuming all of the cyanide was leachable.

Sterling Axle Plant
Figure 2

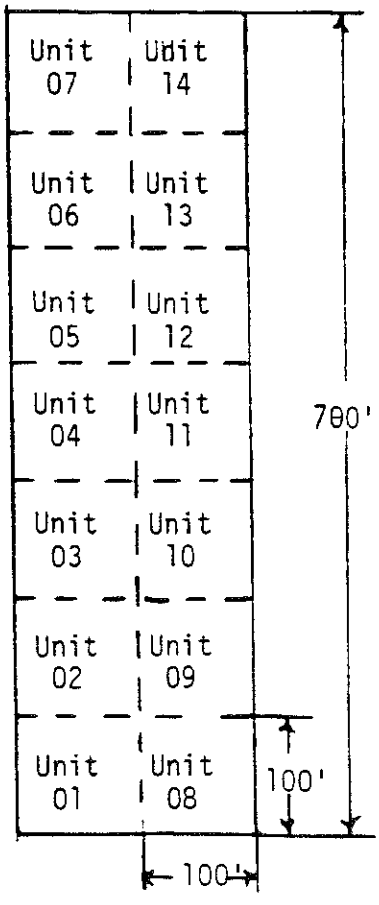
Northwest Lagoon

Random Sampling Order
06,07,11,05,01,
09,10,12,04,08
02,03



Northeast Lagoon

Random Sampling Order
08,05,14,12,01,10,06
03,09,02,11,13,07,04



Sampling Procedures

Lagoon Sampling

The Northeast and Northwest Lagoon samplings were performed individually using the "simple random sampling" method, as described in EPA SW846, 2nd edition. The surface dimensions of the lagoons were measured and found to be as shown in Figure 2. The perimeter of each lagoon was then staked off to form segment units of equal size for each individual lagoon (see Figure 2). The segment units were numbered and a random number table used to determine the order in which the segment units for each lagoon would be sampled. Four segments were sampled for each lagoon.

Each numbered segment was representatively sampled using a 15-foot long, 1½ inch I.D., thick wall, PVC coring tube. The open tube was pushed vertically down through the sludge to the bottom of the lagoon. The tube was then capped and withdrawn from the sludge. The cap was removed and the column of sludge deposited into a 5 gallon bucket. Four randomly located columns of sludge were taken from each unit and composited in the bucket to form one well mixed sample from each unit. Approximately 1 liter of sample was taken from this composite to be submitted to the laboratory for analysis.

Access to the sampling locations in the Northeast Lagoon was accomplished by extending a portable walkway on the surface of the semi-solidified sludge. The Northwest sampling locations were accessed by rowboat.

The samples were collected by:

- Mr. Thomas Geyer
  Ford Motor Company
  Stationary Source Environmental Control Office (SSECO)
  B.S. Chemistry
  Nine (9) years environmental control experience

- Mr. Edward Chraszcz
  Ford Motor Company
  Stationary Source Environmental Control Office
  B.S., M.S., Aquatic Biology
  Six (6) years environmental control experience

- Ms. Kathy Burge
  Ford Motor Company
  Stationary Source Environmental Control Office
  B.S., M.S. in Biology
  Four (4) years environmental experience

Analytical Procedures

Leaching Procedure

Lagoon sludges were leached as received.

All samples were leached with an appropriate volume of D.I. water. This mixture was mechanically stirred for a 24-hour period during which time the pH was maintained at 5.0±0.2 using dilute acetic acid. Following leaching, the sample was pressure filtered through a 0.45u membrane filter. The filtered leachate was collected and preserved at a pH<2 with nitric acid.

The procedure follows, precisely, the Method 1310 outlined in EPA Manual SW846, 2nd edition, "Test Methods for Evaluating Solid Waste." The persons performing this procedure and the equipment used are listed below:

Personnel:

- Ms. Rhonda Berger
  Ford Motor Company
  Stationary Source Environmental Control Office (SSECO)
  B.S. in Environmental Sciences
  Four (4) years environmental experience

- Mr. Robert Singer
  Ford Motor Company
  Stationary Source Environmental Control Office
  Some college chemistry
  Seven (7) years environmental experience

Equipment:

Millipore Pressure Filter Model YT30 142HW
3000 ml Pyrex Organic Reaction Vessel
Stainless Steel Stirring Blade
Stirring Motor
Extech Model 631 pH-temp. meter

Personnel:

- Ms. Sue Scott
  Hydro Research Services, Pontiac, Michigan
  Supervisor
  Eight (8) years analytical experience

- Ms. Mary Jones
  Hydro Research Services
  B.A. Chemistry
  Two (2) years analytical experience

- Ms. Nancy Campbell
  Hydro Research Services
  B.A., M.A. Education
  Ten (10) years as science teacher

- Ms. Cathy Novak
  Hydro Research Services
  Certified Laboratory Technologist
  Three (3) years experience

Equipment:

Rae Corporation Slow Speed Stirrer, Model #5VB
Millipore Pressure Filtration System, Model #XX6700P10
Corning Digital PH Meter, Model #110

Metals Analysis

Sludge preparation for the analyses of metals, except Mercury, employed either the nitric/hydrochloric or nitric/hydrochloric/peroxide digestions as per SW846 Methods 3010 and 3050 respectively. The digestion of sludge for Mercury analyses was performed by Method 7471. The previously acidified leachates were not digested.

Atomic absorption analyses for both sludge and leachate samples conformed to the following methods:

Parameter	Method Description	Reference SW846, 2nd Edit. Method
Arsenic	Gaseous hydride	7061
Barium	Direct aspiration	7080
Cadmium	Direct aspiration/standard addition	7130
Chromium	Direct aspiration/standard addition	7190
Copper	Direct aspiration	7210
Lead	Direct aspiration	7420
Mercury	Cold vapor	7471
Nickel	Direct aspiration/standard addition	7520
Selenium	Gaseous hydride	7741
Silver	Direct aspiration	7760
Zinc	Direct aspiration	7950

The individuals performing the metals analyses and the instrumentation employed are as follows:

Personnel: Ms. Cecilia Vernaci
Hydro Research Services
B.S. Biology
Four (4) years analytical experience

Ms. Mary Jones
Hydro Research Services
B.A. Chemistry
Two (2) years analytical experience

Mr. Robert Singer
Ford SSECO
Some college chemistry
Seven (7) years environmental experience

Instrumentation: Instrumentation Laboratory Model 353 Atomic Absorption Spectrophotometer

Instrumentation Laboratory Model 151 Atomic Absorption Spectrophotometer

Cyanide Analysis

Cyanide analyses were conducted on the actual sludge samples. The initial sample preparation and distillation conformed to Method 9010 of SW846 2nd Edition. A color development step corresponding to EPA Method 335.2, i.e., pyridine/barbituic acid, was substituted for the silver nitrate titration as outlined in Method 9010. The primary purpose for this change was to obtain acceptable detection limits while minimizing the affect of possible interferences.

The names and qualifications of the individuals performing the analyses and instruments used are as follows:

Personnel:

- Ms. Sue Scott
  Hydro Research Services
  Supervisor
  Eight (8) years analytical experience

- Ms. Mary Jones
  Hydro Research Services
  B.A. Chemistry
  Two (2) years analytical experience

- Ms. Nancy Campbell
  Hydro Research Services
  B.A., M.A. Education
  Ten (10) years teaching experience

- Ms. Cathy Novak
  Hydro Research Services
  Certified Laboratory Technologist
  Three (3) years experience

Instrumentation:

Bausch & Lomb Spectronic 88 Spectrophotometer

Results

Tables 2, 3, 4 and 5 contain the individual sample results from which the data summary (Table 1) was derived. Table 2 summarizes the heavy metals data for the leachate. Table 3 shows the standard addition data for cadmium, chromium and nickel leachates, the metals for which F006 is listed. Table 4 reports the total cyanide values plus standard addition results. Cyanide results are reported on sample as received. Theoretical results for cyanide by standard addition are listed in parentheses and are calculated based on the weight of sample used. Table 5 includes the total metals values for the heavy metals, and also the % solids determination for each sludge sample.

Table 2

Summary of Analytical Data
Sterling Axle Plant
Sludge Leachate Metals (mg/l)

Date Sampled	Sample Description	As	Ag	Ba	Cd[1]	Cr[1]	Cu	Hg	Ni[1]	Pb	Se	Zn
6-2-83	NE Lagoon Sludge #5	0.029	< 0.02	0.1	0.03	<0.02	0.03	<0.0005	0.87	<0.05	<0.005	1.4
6-2-83	NE Lagoon Sludge #8	0.026	< 0.02	0.5	0.04	<0.02	0.02	<0.0005	1.34	<0.05	<0.005	3.0
6-2-83	NE Lagoon Sludge #12	0.006	< 0.02	0.1	0.02	<0.02	<0.02	<0.0005	0.40	<0.05	<0.005	1.0
6-2-83	NE Lagoon Sludge #14	0.006	< 0.02	0.4	0.03	0.04	<0.02	<0.0005	0.48	<0.05	<0.005	1.0
6-3-83	NW Lagoon Sludge #5	0.010	0.02	0.6	0.05	<0.02	<0.02	<0.0005	1.01	<0.05	<0.005	2
6-3-83	NW Lagoon Sludge #6	0.007	0.02	0.8	0.04	<0.02	0.03	<0.0005	1.11	<0.05	<0.005	2.3
6-3-83	NW Lagoon Sludge #7	0.009	0.03	0.8	0.04	<0.02	0.03	<0.0005	1.00	<0.05	<0.005	2.1
6-3-83	NW Lagoon Sludge #11	0.009	0.02	0.5	0.03	<0.02	0.02	<0.0005	0.84	<0.05	<0.005	1.7

[1] By standard addition

Table 3

Summary of Analytical Data

Sterling Axle Plant

Leachate and Standard Addition Results (mg/l)

Date Sampled	Sample Description	Cd				Cr				Ni			
		Neat	Spike 1	Spike 2	Spike 3	Neat	Spike 1	Spike 2	Spike 3	Neat+	Spike 1	Spike 2	Spike 3
6-2-83	NE Lagoon Sludge #5	0.03	0.98	1.94	3.09	<0.02	0.92	1.98	2.98	0.87	1.86	2.84	3.80
6-2-83	NE Lagoon Sludge #8	0.04	1.00	2.01	3.02	<0.02	1.00	1.98	3.12	1.34	2.46	3.26	4.24
6-2-83	NE Lagoon Sludge #12	0.02	0.97	1.96	3.02	<0.02	0.98	1.94	2.98	0.40	1.28	2.32	3.28
6-2-83	NE Lagoon Sludge#14	0.03	0.99	1.99	3.06	0.04	1.02	2.06	3.18	0.48	1.52	2.50	3.48
6-3-83	NW Lagoon Sludge #5	0.05	1.02	2.08	3.12	<0.02	1.00	2.10	3.18	1.01	2.10	3.08	4.10
6-3-83	NW Lagoon Sludge #6	0.04	1.00	2.04	3.10	<0.02	1.12	2.10	3.08	1.11	2.10	3.08	4.06
6-3-83	NW Lagoon Sludge #7	0.04	0.99	2.01	3.14	<0.02	1.02	2.10	3.16	1.00	2.02	2.96	3.96
6-3-83	NW Lagoon Sludge #11	0.03	1.01	2.02	3.02	<0.02	0.98	2.12	3.04	0.84	1.80	2.84	3.78

Spike No.	Cd, Cr, Ni
1	1.0 ppm
2	2.0 ppm
3	3.0 ppm

Table 4
Summary of Analytical Data
Sterling Axle Plant
Total Cyanide and Standard Addition Results

Date Sampled	Sample Description	Total Cyanide As Received	Spike 1 Actual	Spike 1 Theo-retical	Spike 2 Actual	Spike 2 Theo-retical	Spike 3 Actual	Spike 3 Theo-retical
6-2-83	NE Lagoon Sludge #5	1.3 mg/kg	2.8	3.7	4.2	6.2	5.9	9.8
6-2-83	NE Lagoon Sludge #8	0.7 mg/kg	2.6	2.7	4.4	5.4	7.0	10
6-2-83	NE Lagoon Sludge #12	0.5 mg/kg	1.6	1.6	3.1	3.0	5.3	5.9
6-2-83	NE Lagoon Sludge #14	0.5 mg/kg	1.4	1.5	3.2	3.1	5.2	5.6
6-3-83	NW Lagoon Sludge #5	0.8 mg/kg	1.9	1.9	2.7	3.1	5.9	6.2
6-3-83	NW Lagoon Sludge #6	1.9 mg/kg	2.4	2.6	5.1	8.1	6.8	13.8
6-3-83	NW Lagoon Sludge #7	1.0 mg/kg	3.1	2.9	3.9	6.3	7.1	11.5
6-3-83	NW Lagoon Sludge #11	1.1 mg/kg	1.3	3.9	3.4	6.4	6.0	11.4

Table 5

Summary of Analytical Data
Sterling Axle Plant
Total Metals from Sludge (mg/Kg Wet)

Date Sampled	Sample Description	As	Ag	Ba	Cd	Cr	Cu	Hg	Ni	Pb	Se	Zn	% Solids
6-2-83	NE Lagoon Sludge #5	11	<0.8	120	4.4	79	110	0.1	69	250	<0.1	370	67.5
6-2-83	NE Lagoon Sludge #8	10	1.2	92	3.8	56	84	0.1	60	220	<0.1	290	57.4
6-2-83	NE Lagoon Sludge #12	9.7	1.3	110	3.8	69	120	0.1	66	260	<0.1	330	65.3
6-2-83	NE Lagoon Sludge #14	11	1.3	87	3.9	64	110	0.1	65	220	<0.1	290	54.5
6-3-83	NW Lagoon Sludge #5	15	<0.8	72	3.4	52	110	0.1	56	120	<0.1	230	51.2
6-3-83	NW Lagoon Sludge #6	14	<0.8	69	3.8	56	110	0.1	60	110	<0.1	220	50.9
6-3-83	NW Lagoon Sludge #7	14	1.0	56	3.3	63	110	0.2	55	100	<0.1	190	47.0
6-3-83	NW Lagoon Sludge #11	12	<0.8	39	2.3	33	120	<0.1	38	82	<0.1	130	39.1

Statistical Calculations

In accordance with EPA Manual SW846, 2nd edition, statistical calculations were performed on the leachate data for the heavy metals. This was done specifically to determine, for each metal, the concentration that would not be exceeded in a leachate 80% of the time, i.e., an 80% Upper Confidence Limit (UCL). The results of these calculations appear in Table 1. The formula that was used appears below, along with an example calculation using the zinc data from the Northeast Lagoon sludge.

Formula:

Upper Confidence Limit (UCL) = $\bar{x} + t_{0.20} S_{\bar{x}}$, where:

$\bar{x}$ = mean of sample measurements

$t_{0.20}$ = the student's "t" value for a two-tailed confidence interval, a probability of 0.20, and n-1 degrees of freedom (df), where n is the number of samples taken.

$S_{\bar{x}}$ = the standard deviation of the sample mean.

Example UCL Calculation: (from leachate of NE Lagoon sludge)

$$\bar{x} = \frac{1.4 + 3.0 + 1.0 + 1.0}{4} = 1.6 \text{ mg/l}$$

$t_{0.20,df=3} = 1.638$

$S_{\bar{x}} = 0.48$

$UCL_{Zn} = 1.6 + (1.638 \times 0.48) = 2.38$ mg/l

Certification Statement

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this demonstration and all attached documents, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibilities of fine and imprisonment.

A. B. Manzella, Manager 8/22/83

Plant Engineering Dept.
Sterling Plant